Washington Park

ARBORETUM BULLETIN

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Concerning This Issue. . .

One day I headed into the Washington Park Arboretum via the historic Lynn Street Bridge. Two friends were strolling toward me. They had a question. "We just saw a sign and we want to know: What exactly is a 'Mulligan Sorbus'?" Art Kruckeberg explains the origins of the outstanding "Mulligan *Sorbus* Collection" (mountain ash) in the second of a four-part series on the contributions of Director Emeritus Brian O. Mulligan.

People join The Arboretum Foundation to learn tree identification. These days, when I hike in the mountains, I expect each unknown tree to sport a green plastic label for my instant edification. Van Bobbitt and Arthur Lee Jacobson edify us on these pages through a walking tour of special trees on the University of Washington campus.

We go farther afield to see Jan Pirzio-Biroli's tribute to the unique garden once owned by MayBelle and Chris Johnson. Closer to home, Curator Tim Hohn fully catalogs for us what survived and what was damaged in the Arboretum last winter. Chris Pfeiffer explains what else has been happening "In the Arboretum."

When I first came to Seattle (a naive East Coast transplant), I thought the Arboretum was a wildlife preserve. The wildlife in the Japanese Garden comes to life in Tim Grendon's article.

Also in this issue, Victor Scheffer explains the process of sifting soil for beginners and Dan Hinkley shows how to save seed. Van Bobbitt discusses drainage myths and "The Northwest Garden Explorer" takes us to a garden comprised of Northwest native plants. Valerie Easton informs us about the many journals and newsletters that would add to our horticultural reading pleasure.

The Bulletin welcomes four new editorial board members: Jerry Clark, Richard Walker, Virginia Morell, and Scot Medbury (a.k.a. the "Northwest Garden Explorer," seen here each issue). This spring, Susie Marglin became the advertising manager who is taking our ad policy into the 1990s and increasing advertising revenue. We are pleased to have her representing us in the community. We also welcome Dick Doss, president of The Arboretum Foundation, and look forward to working with him.

Thanks go to Elizabeth Moses, out-going president, for her considerable efforts on behalf of the *Bulletin*—from helping with advertising policy to assembling the hard-working individuals who comprise the editorial board. We wish Elizabeth well as she looks forward to new-found time for tending her own garden.

Jan Silver, Editor
The Washington Park Arboretum Bulletin

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Photo of Crape Myrtle by Arthur Lee Jacobson

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Cover: A pocket of plants at MayBelle and Chris Johnson's former house. The finely dissected fern is *Dryopteris dilatata* 'Grandiceps'. Below, far left is *Oxalis* and salal (center). *Vancouveria hexandra* is on the far right. Photo by Don Normark, courtesy of *Sunset Magazine*.

The Washington Park Arboretum Bulletin is published quarterly, as a bonus of membership in The Arboretum Foundation. The Arboretum Foundation is a non-profit organization that was chartered to further the development of the Washington Park Arboretum, its projects and programs, by means of volunteer hours and fund-raising projects. The Washington Park Arboretum is administered through cooperative efforts between the University of Washington, the Center for Urban Horticulture, and the City of Seattle Department of Parks and Recreation. The programs and plant collections are a responsibility of the Center for Urban Horticulture.

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Brian O. Mulligan surveys a group of S. aucuparia *var.* edulis *(1169-47) and* S. pohuashanensis *(1083-45) in fruit, October 13, 1955. (Photo by Don Normark).*

The Mulligan Sorbus Collection

by A. R. Kruckeberg

Since 1988, visitors to the Washington Park Arboretum have noticed a major undertaking in progress, just off the upper drive, east of the Magnolia collection. The rich *Sorbus* collection along the Broadmoor fence is being renovated in anticipation of a noteworthy dedication. The large grouping of species all in one genus will be known as the Mulligan *Sorbus* Collection, encompassing probably the most extensive array of mountain ashes, rowans, and whitebeams under cultivation in North America. But what is the connection between *Sorbus* and Director Emeritus Brian Mulligan?

During his long tenure as director, Brian pursued the challenge to amass a fine collection of woody plants throughout the Arboretum. Many fine groupings came into being under Brian's critical eye. And *Sorbus* was a favorite from the beginning. It all began at Wisley in England. . . .

Rather than ferret out salient facts second-hand, I interviewed Brian one-on-one. The story of his long fascination with the mountain ash genus started with his sojourn as assistant director of the Royal Horticultural Society's garden at Wisley, United Kingdom. Brian held that post during the mid-1930s to 1941. He "discovered" *Sorbus* then, giving particular attention to the proper naming of the Wisley holdings in the genus. During this period, Brian also became familiar with the W. J. Marchant Nursery in Dorset which had a sizable collection of *Sorbus* species. By this time, the rich variety of plants collected by E. H. Wilson, George Forrest, and Captain Kingdon-Ward in western China was now maturing in gardens and trial grounds in Britain.

Soon after assuming directorship of the then-University of Washington Arboretum, Brian began to

Whitie Marten

Sorbus discolor *(943-41), November 1,1955. This is an example of compound-leafed* Sorbus.

Courtesy of Center for Urban Horticulture

Sorbus chamaemespilus *var.* sudetica, *in fruit, September 9, 1959. Note simple (entire) leaves.*

bring together our own sampling of the wealth of *Sorbus* species. The earliest plantings were in the area near the Museum of History and Industry. But the Evergreen Point Bridge access took priority over these plantings. The *Sorbus* collections then were moved to the present location in 1960, where a *Sorbus* planting had already been started in 1955. And that's how it all began, with over 50 years of Brian's devotion to *Sorbus* to be capped with the garden which will be dedicated in his honor in 1990.

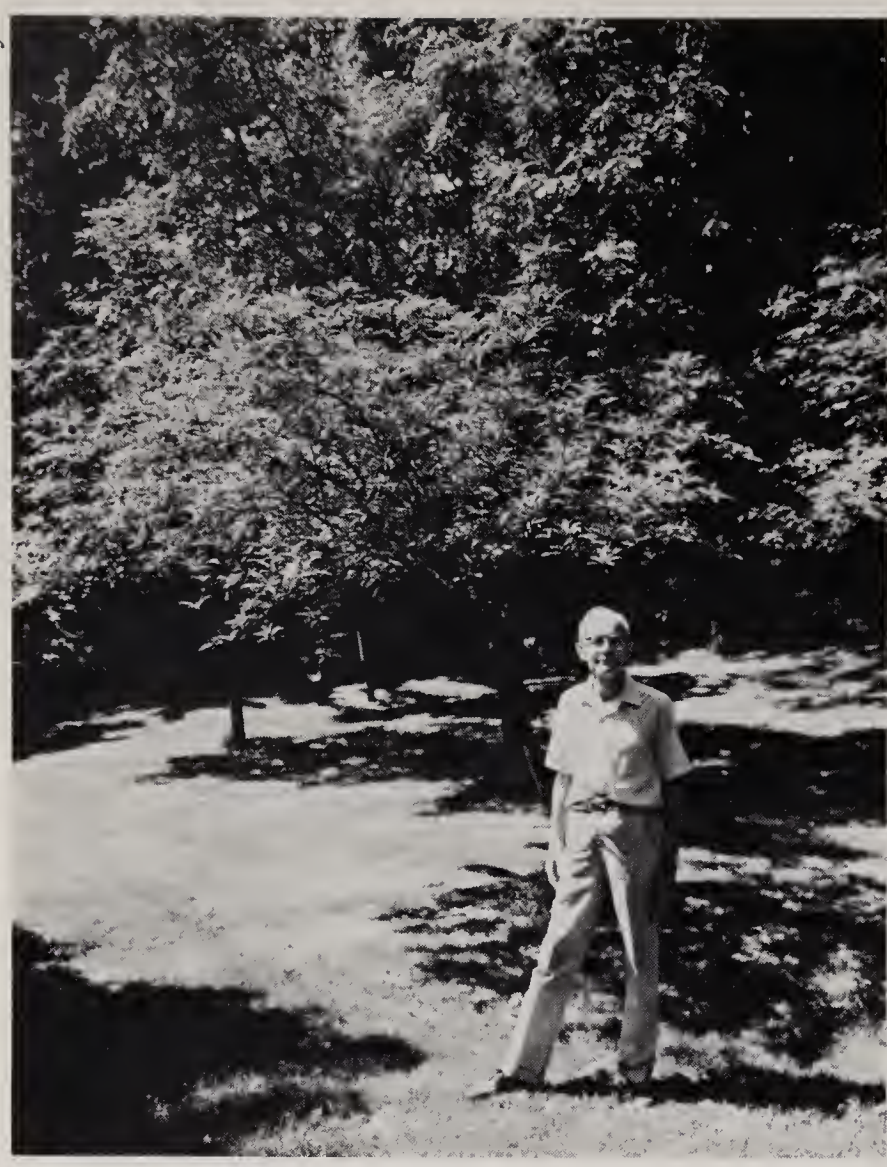
But what is *Sorbus?* The word is classical Latin for a species in a genus. Most gardeners know it through its commonest species, *S. aucuparia*, the European mountain ash. More's the pity, because the genus of 80 to 100 species has many fine species as yet rarely grown in gardens. The genus is allied to *Cotoneaster*, *Amelanchier*, *Malus*, and other ''apple-fruited'' members of the Rose Family (Rosaceae). *Sorbus* consists of two main groupings: The compound-leafed species (thus making the superficial link to *Fraxinus*, the true ashes), and those with simple (undivided) leaves.

The Aucuparia group with compound leaves offers many fine species for the garden besides *S. aucuparia*: *S. discolor* (white fruits), *S. hupehensis* (pink or white fruits), *S. koehneana* (a good shrubby species), *S. forrestii* (related to the white-fruited *S. prattii*, still rare in cultivation), and *S. vilmorinii* with delicate ferny foliage. All members of the Aucuparia group merit wider cultivation. The several North American species are also of the Aucuparia alliance. Here in the Pacific Northwest, the two native species—*S. sitchensis* and *S. scopulina*—are shrubby, usually occurring from mid-to-high elevations in our mountains. Brian and his wife, Margaret, have had a special affection for our native mountain ashes: They have successfully grown them in Seattle, particularly *S. scopulina* var. *cascadensis*, the Cascade mountain ash.

The simple-leafed species (Section Aria) are best known by *Sorbus aria*, the common whitebeam of Great Britain and Europe. It is a fine, large tree for full sun; its leaves have a white woolly tomentum, giving a silvery cast to them seen from beneath. Its fruits are large and red—quite showy. Relatives of the whitebeam range through Europe, the Near East, and to the Himalayas and western China. Indeed, like so many other temperate flowering plants, western China is the epicenter of the genus. My favorite Aria member is *S. caloneura*, with its boldly embossed leaf veining.

The Arboretum's collection of *Sorbus* is impressive, both for the compound-leafed and for the entire-leafed kinds. Brian Mulligan's 1988 tally of *Sorbus* in the Arboretum reveals totals of 36 species, three varieties, four hybrids, and seven cultivars. The collection is about evenly divided between the two main groups.

The reader will wonder why no mention has been made of *Sorbus* flowers. The best that can be said for



R. Bruce Eckley

Brian Mulligan in Sorbus *collection, 1989.*

its flowers is that the smallish white blossoms are borne in many-flowered clusters, to give a rather pleasing effect with the whole tree in bloom. But the worst has to be said, as well. The flowers have an unpleasant odor, one that cannot be described in mixed company. So, with so many rewarding features—foliage, fall color, and gorgeous red, pink, or white fruits—we may forgive *Sorbus* this one malodorous defect.

I hope that *Sorbus* will gain in garden popularity in times to come. Its time *has* come; all it takes is a breaking out of the horticultural "Catch 22"—a plant isn't grown because it isn't popular and it isn't popular because it is not available, etc. Surely the new Mulligan *Sorbus* garden in the Arboretum will do much to break that deadlock.

Arthur R. Kruckeberg has been a professor of botany at the University of Washington since 1950. He is a founder of the Washington Native Plant Society and consults on environmental impacts, plants, and vegetation. He and his wife Mareen have the MsK Nursery on their four acres north of Seattle. They specialize in unusual shrubs and rock garden plants.

William Eng

Infloresence of Sorbus koehneana, *in Arboretum. Flowers are 6 mm wide and hawthorn scented.*

Thought for Seed

by Daniel Hinkley

When collecting, storing, or sowing seed, we as horticulturists, botanists, and garden enthusiasts generally have only an end product in mind—a living plant. By understanding the processes of sexual propagation of plants, however, we also comprehend the omnipresent intricacies that encompass the system of life on this planet. In nature, genetic variation among seedlings, because of gene mutation or recombination, can be advantageous because it allows a particular species to adapt to changes in the environment. In ornamental horticulture, this genetic plasticity allows the observant eye to select for deviations. Here, the deviations represent many of the plant cultivars in existence today.

It is only in the past few years that I have returned with renewed interest to propagation of plants by seed. In all but the rare cases of graft chimeras, asexual propagation techniques (cuttings, grafting, and tissue culturing) produce exact duplicates of the parent plant. (With chimeras, the resulting plant may exhibit the flower and foliage characteristics of both the rootstock and scion, as well as intermediate phenotypes. An example is when *Cytisus purpureus* is grafted on *Laburnum anagyroides* rootstock. The resulting plant is treated taxonomically as a bigeneric hybrid as in + *Laburnocytisus adamii*.)

Whereas asexual propagation methods are invaluable to the horticultural industry for the reproduction of cultivars that cannot be maintained by seed, the true adventure of propagation by seed is never being absolutely certain of what lies within the dormant embryo of the species you sow. This phenomenon may create difficulties for arboreta and botanical gardens involved in seed exchange programs wishing to provide seed that is "true." However, this "difficulty" often leads us to many plants of great horticultural value. *Mahonia* 'Arthur Menzies', for example, introduced by Washington Park Arboretum, is a selection from seedlings germinated at Strybing Arboretum as *Mahonia lomariifolia*. The appearance of this striking plant suggests that it originated as an unintentional hybrid of *Mahonia lomariifolia* and *Mahonia bealei*. It is important to note as well that the desirable traits of many plant cultivars do indeed come true from seed. *Stranvaesia davidiana* 'Fructu Luteo', for example, will yield plants which exhibit varying degrees of the desired yellow fruit color. Recently germinated seeds from *Acer pseudoplatanus* 'Prinz Handjery', a cultivar with brilliant pink new growth, also have shown a remarkable similarity to the cultivar.

Learning basic rules of seed collection that apply to cleaning, storing, and eventually sowing can provide a new dimension in the life of the horticulturist. Within each seed lot awaits a spectrum of variability that may provide both visual diversity as well as differences in hardiness and resistance to diseases and insects of the plants we grow. In this article, the principles of seed collection, cleaning, and storing will be discussed.

Time to Collect Seed

By early to mid-summer, many of the early blooming plants have mature seed-bearing fruit. The proper time of collection can vary from year to year by several weeks, depending on the bloom date of the current year or the weather conditions at the time of ripening. The more mature a seed at the time of harvest, the more vigor the seedling will exhibit at the time of germination. An even creamy-yellow color of the endosperm (the food which surrounds the embryo of each individual seed) is a good indication of ripeness. Green seed generally should be avoided, with a few exceptions: Fruit collected from all *Daphne* species in July and August, while still green, will germinate upon sowing. If the fruit is allowed to ripen before collection, however, dormancy mechanisms will have developed and germination will not take place for one or two years. Another exception to the rule is to collect maple samaras ("winged seed") in September and October while the fruit is still green and the attached wing is just turning brown.

Cleaning and Storing

Correct handling after harvest is paramount if the embryo is to remain viable up to the point of sowing. The seeds of most plants can be categorized into three seed types, each with somewhat different post-harvest treatment.

Fleshy fruits are found in many genera such as *Lindera*, *Mahonia*, *Gaultheria*, *Berberis*, and *Davidia*. The flesh of these seeds should be removed before storage and sowing. When uncleaned fruit is stored, it can lead to disease and damage to the embryo through fermentation. In addition, dormancy-inducing compounds can be found in the fruit of some taxa which will actually prevent germination of the seed.

"I've often been startled when witch hazel fruit discharge their seeds in bags near my desk."

To remove the flesh, put one part seed to four parts water in a food processor and process with the dough blade for a few seconds on the "pulse" setting. Pour the slurry produced by pulsing into a cup and leave to settle for up to several days. The seeds will sink to the bottom of the cup with the excised pulp rising to the top. When this happens, decant with slowly running water from the faucet to remove the pulp; the desired cleaned seeds will be left behind. Strain the seeds and then allow them to dry thoroughly on paper towels. The dried seeds are ready for storage.

Dehiscent fruit is exemplified by *Catalpa*, *Hamamelis*, *Cercidiphyllum*, *Eucalyptus*, *Wisteria*, *Stewartia*, and conifer cones. The fruit is dry when ripened and opens along lines, valves, or pores to disperse the seeds within. For taxa such as these, put the fruit in paper bags and store in a warm, dry area. Be sure to use paper containers in this process. Plastic bags and glass containers will wreak havoc on your collection by facilitating the development of destructive fungi on the seed. The fruit will often expel the seeds on their own once they are completely dry. This can happen within hours for smaller fruit or up to several weeks for others. (I've often been startled when witch hazel fruit discharge their seeds in bags next to my desk). I resort to using my food processor on stubborn fruit, such as the katsura, which reluctantly releases its progeny even when completely dry.

Indehiscent fruit has single seeds with an adhering fruit or structure that aids in dispersal. These include acorns, walnuts, pistachios, maples, and ashes. Cure under warm conditions in paper containers for up to several weeks until the seeds appear completely dry. These seeds will often respond better to immediate sowing or moist stratification (pretreatment of the seed in moist media under cool conditions), rather than the curing process. Your approach will depend on whether you are doing this for personal use or seed exchanges.

Once your seeds have been properly cleaned and cured, you can extend their storage life by reducing the temperature. For every drop of 10° and 1% moisture of the seed, storage life doubles. The temperature of most refrigerators (41° F) is ideal for short-term storage. Seeds also may be successfully stored in the subfreezing temperatures of the freezer if the embryo is properly dried beforehand. Once completely dry, store the seeds in plastic bags until the time for pretreatment or sowing arrives. Seeds which retain their food reserves in the form of fats rather than carbohydrates, as do acorns and peonies, have a shorter storage life. Many seeds unearthed in peat bogs of Europe have successfully germinated after more than 1,000 years.

Plant propagation is a true union of art and science. It is through our experiences, both the failures and successes, that we are enlightened to the perfection of plant survival mechanisms.

Dan Hinkley is a full-time educator at Edmonds Community College and teaches, among other subjects, plant propagation. He is a partner in Heronswood Nursery, a specialty plant nursery in Kingston, Washington, and is a member of the *Arboretum Bulletin* editorial board.

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The Johnsons' "Complicated" Garden

by Jan Pirzio-Biroli
Photos by Don Normark, courtesy of *Sunset Magazine*

MayBelle Johnson's first garden was for practice. Her second one remains a showplace on Mercer Island, Washington, as she and her husband Chris move on to garden number three.

"Grandmother, your garden is so complicated. I love it!" This exclamation came from a five-year-old child in reference to MayBelle and Chris Johnson's garden. The large garden—their first—was part of an older home near the north end of Mercer Island where the Johnsons brought up their children. It was a learning experience for them both, although MayBelle is one of those rarities—a second-generation gardener (her mother was a collector of primroses).

In 1966, when the Johnsons no longer needed extra space, they sold this wonderland and boarded out a few treasures to gardening friends. They lived in an apartment for a year while their dream home was built on a small view lot overlooking the East Channel and Mt. Rainier on Mercer Island's southern tip.

Again, MayBelle created a "complicated garden." The Johnsons' new landscape exploited its smaller size by using many fewer plants. They

A mixed perennial bed between the entrance terrace and "meadow" of MayBelle and Chris Johnson's former home. The large, rounded, lobed leaves are a species of Geranium.

were carefully spaced with an eye to ultimate size, the whole associated with multiple combinations of ground covers. Rare shrubs and small trees complement rhododendrons which are the backbone of the garden. (Chris was once president of the Seattle Rhododendron Society.) Some of the huge Douglas-firs, left in place at the beginning, have outgrown their allotted space with increased watering and been removed. The presence of good forest duff from their needles and from rotting logs, as well as sandy soil, provides the ideal combination for the successful establishment of difficult plants.

The Entrance

The place is easy to find: The entrance is marked by a pair of contorted birches with peach-colored bark (*Betula albo-sinensis* var. *septentrionalis*). These rise above an enormous specimen of *Elaeagnus* x *ebbingei* whose evergreen leaves serve to screen the driveway from the neighboring property. The entrance to the garden is through a small cast iron gate that follows a path lined at the base of the garage with lemon-flowered *Epimedium versicolor* 'Sulphureum' whose rust-colored leaves remain evergreen until spring. On the other side of the path, a vine-covered fence borders the entry court which has been designed as a miniature mountain meadow.

The Meadow

Since the house is set back from the road, the meadow is more spacious than a typical front yard. It is enclosed by fences and screened from the street by a Japanese larch (*Larix kaempferi*) and a towering specimen of *Eucryphia* x *nymansensis* which is covered with white, camellia-like flowers in July and August. Mature lepidote rhododendrons form a transition to the meadow proper. Included is *Rhododendron augustinii*, which the Johnsons obtained many years ago at their first Arboretum Foundation plant sale, as so many others have done after being impressed by the border of these magnificent shrubs at the north end of Azalea Way.

The meadow floor is a tapestry of ground covers: *Dryas octopetala*, *Cyclamen hederifolium*, *Cornus canadensis*, sedums, *Vaccinium vitis-idaea* subsp. *minus* (lingonberry), and the beautiful evergreen strawberry from coastal regions of the eastern Pacific, *Fragaria chiloensis*. These add touches of white and reddish tones throughout the year against a background of varying greens and multiple textures. Even *Oxalis oregana* and that rogue of violets, the mauve-flowered *Viola rupestris*, have been permitted to associate with the other more aristocratic plants. This carpet is underplanted with a multitude of miniature bulbs for added interest and color. One corner features a group of dwarf, yellow-flowered rhododendrons. Mass plantings of *Iris japonica* and delicate ferns occupy marginal areas. The lavender iris grows in full sun on a slope near the fence, and the ferns are shaded by the larch.

MayBelle's "Treasure Trove"

Between the entry path and the house is MayBelle's "treasure trove," a sunken area intended to be viewed from inside of the house. Wild ginger (*Asarum caudatum*) and *Blechnum penna-marina* (creeping evergreen fern) are luxuriously established here in combination with hellebores and *Athyrium niponicum* 'Pictum' (painted fern). Low rhododendrons, including the two different forms of the lavender-flowered *Rhododendron hippophaeoides*, form a barrier along its upper edge. Guarding the entry is a huge specimen of *Rhododendron* 'Sir Charles Lemon', beautiful throughout the year with its deep russet indumentum of the leaves.

Plant tapestries and multiple combinations are one component of the garden, spaced out by low swaths of individual plantings. The *Epimedium* border near the garage is one of the latter. *Pileostegia viburnoides*, an evergreen vining hydrangea relative, covers a rotted log that was left in place when the house was built. A single specimen of the prostrate clone of *Stranvaesia davidiana* var. *undulata* is 3 x 12 feet long. This does not approach the 25-foot diameter of Elizabeth Blackford's parent plant (from which most specimens in Puget Sound gardens are derived), but it is impressive. MayBelle says that Mrs. Blackford's plant was a sport that only can be propagated vegetatively because seedlings from the clone grow in all sizes.

The crisp, glossy yellow-green leaves and scarlet fruits of this beautiful plant contrast with the blue-green foliage of *Sequoia sempervirens* 'Prostrata' ('Cantab') creeping over rocks not far away. The *Sequoia* has been kept low by judicious pruning of adventitious leaders. An ancient specimen of *Rhododendron williamsianum* grows on a low rotten stump. Another small stump is nearly covered by heavily berried wintergreen (*Gaultheria procumbens*) which stands in front of a low fence that supports the purple-leaved grape (*Vitis vinifera* 'Purpurea'). *Sanguinaria multiplex* (double-flowering bloodroot) grows at its base. Southeast of this informal barrier an "allée" leads out to the point. Between path and fence, *Cosmos*, leeks, and sage face the morning sun while lower growing herbs are es-

tablished on the other side.

Clematis and other vines are used with abandon on walls, posts, and fences. A specimen of the white-flowered *Enkianthus perulatus* has been pruned to stay in proportion with a pair of *Rhododendron mucronulatum* that bloom at different times in different colors of mauve. Numerous perennials are combined throughout the landscape including *Monarda* species, various geraniums, and three color variants of windflower (*Anemone japonica*). Gray foliages of *Achillea taygetea* (yarrow), *Artemisia*, and several special forms of *Stachys lanata* (lamb's ears) complement each other in sunny exposures. In early winter, the rhizomatous *Iris unguicularis* offers large flowers of a delicate lavender. Bonsais are grouped on low tables.

In 1989, MayBelle and Chris sold their property and moved to a condominium at Providence Point in Issaquah. They are delighted that the new owners of their second home are enthusiastic gardeners who will maintain and add to the garden that has been central to their lives for so many years.

Will they give up gardening? Of course not! They have space around their condominium and their friends look forward with anticipation to the third Johnson garden. In preparation for the move, the Johnsons potted and took with them a number of favorite plants, including their bonsais. In the meantime, the Arboretum also has benefited from this second move. The Johnsons' wheel tree, *Trochodendron aralioides* (''a cutting of a cutting,'' says MayBelle) now decorates the south courtyard of the Graham Visitors Center. It was given as a featured plant in the Arboretum's display at the 1989 Northwest Flower and Garden Show.

Jan Pirzio-Biroli is a naturalist at the Washington Park Arboretum. She has a master's degree in botany (taxonomy) and is a former editor of the *Bulletin*.

A view at the entrance side of the treasure trove framed on the left by Rhododendron *'Sir Charles Lemon'. The ferns are maidenhair (*Adiantum pedatum*), Japanese painted fern (*Athyrium niponicum 'Pictum'*) and the creeping* Blechnum pennamarina. *The rounded leaves are wild ginger (*Asarum caudatum*) and* Syntheris reniformis *(far right).*

Eight Big Trees at the University of Washington: A Self-guided Tour

by Van M. Bobbitt and Arthur Lee Jacobson

Photos by Arthur Lee Jacobson

Degree of difficulty: Easy and level walking.

Time: About an hour.

Best time of year: Anytime from mid-April through early November. The autumn color of the deciduous trees is usually at its peak from mid-October through early November.

Parking: The Central Plaza garage has visitor parking. It can be entered from the intersection of 15th Avenue N.E. and N.E. 41st St. The walk will end just south of this garage.

Buses: Any buses that travel through the University District on 15th Avenue N.E. or University Way N.E. will provide easy access to the campus.

To get back to your bus or car: Follow Stevens Way out to 15th Avenue N.E. to catch a bus. To get back to the Central Plaza Garage, walk north along Stevens Way to the garage entrance at the east side of Meany Hall.

The University of Washington campus has quite a collection of trees. It contains over 375 species, cultivars, varieties, and hybrids. Because the University has been at this site since 1895, the campus contains some of the oldest and largest trees in Seattle. Unfortunately, in addition to old age, the new buildings and parking structures keep whittling away at the greenery of this lush urban forest. In 1988 alone, 64 trees were removed for the new library site.

The trees you see on this walk are thought to be the largest specimens of their kind in the state of Washington. If you know of larger specimens, please contact the Center for Urban Horticulture and let us know about them.

Our walk begins on the west side of the HUB (Student Union Building).

1. **Cork Oak** (*Quercus suber*).

Location: west side of the HUB, due east of the Alaska-Yukon-Pacific Exposition historical plaque.

Size: 40′ tall.

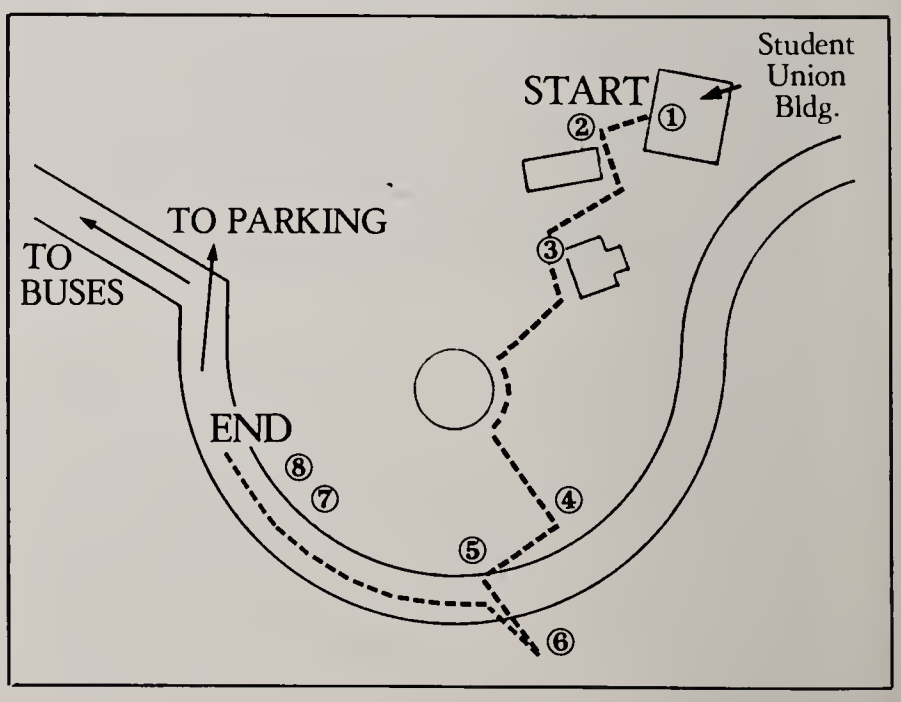
Notice the foliage and bark of this tree. Unlike our northern oaks, this one has rather small, leathery, evergreen leaves. Instead of dropping them all at once in the autumn, it sheds over the year, mostly in the early summer.

Feel the thick, furrowed, spongy bark. This is the commercial source of cork. In Portugal, the world's leading cork producer, these oaks are periodically stripped of their bark in a manner not to hurt the tree, after they are about 20 years old. Then they are stripped every eight to ten years. The first stripping produces a poor quality cork, but thereafter the tree produces a faster-growing, smoother product. They reportedly can survive this treatment for 100 to 500 years, and grow as high as 85′ tall.

Cork oaks are found in at least eight locations in Seattle, and they grow well. They are native to the drier, warmer western and central Mediterranean region. Therefore, when planted in the Pacific Northwest, they need a site with well-drained soil and full sun. The snow storms of January and February 1989 caused major branches to break, disfiguring the University specimen.

2. **Sweet Bay, Grecian Laurel** (*Laurus nobilis*).

Location: adjacent to north entrance to Sieg Hall; located directly behind the institutional sign that



reads "Lee Paul Sieg."

Size: 40′ tall

Unfortunately, one of the most distinguishing characteristics of this particular specimen are curled, sticky leaves. This blemish is caused by insects, probably psyllids which are related to aphids. Otherwise, this is an exceptionally large, healthy, and attractive example of this bay tree. It is naturally multiple trunked.

Sweet bay has influenced cooking and language. Crush its leaves; you instantly will recognize the aroma. *Laurus nobilis* is the original source of bay leaves used in soups and stews.

And how has *Laurus nobilis* influenced our language? Since ancient times, a garland of laurel has symbolized victory or accomplishment, hence the phrase "resting on your laurels." An accomplished bard is referred to as a "poet laureate." At one time, men of learning were crowned with wreaths of fruiting laurel; therefore university students were called *bachelors*, which was derived from the Latin *baccalaurus* (*bacca* = berry. *laurus* = laurel). (This specimen is a male plant and will not produce berries.) Such men were forbidden to marry because it was thought that this would distract them from their studies. Eventually the word *bachelor* was extended to all unmarried men.

3. **Dawn Redwood** (*Metasequoia glyptostroboides*)

Location: northwest corner of Guggenheim Hall

Size: 70′ tall; trunk circumference is 7′9″

If you visit this tree in autumn you may think it is dying because it will be covered with brown needles. Don't worry, though—dawn redwood is a deciduous conifer. New, soft green needles appear in spring.

Another distinctive characteristic of this tree is its strongly tapered trunk, buttressed at the base, covered with attractive cinnamon-orange shredded bark. The side branches angle upwards like uplifted arms complete with an armpit-like depression beneath.

Strong, trouble-free, and handsome year around, dawn redwood has an interesting history as well as excellent landscape value. The genus *Metasequoia* was first established in 1941 by the Japanese botanist Miki. At that time, it was known only from fossils and thought extinct. But in the same year, a Chinese botanist discovered a living tree of *Metasequoia* in eastern Szechuan province. This was officially named *Metasequoia glyptostroboides* in 1948. In December 1947, seeds were received by the Arnold Arboretum of Harvard University. From there, *Metasequoia* was quickly distributed to arboreta throughout North America and Europe. Now, almost 50 years later, the tallest dawn redwoods in western cultivation are over 100′ tall.

*Cucumber tree (*Magnolia acuminata*).*

The dawn redwood is closely related to the coast redwood (*Sequoia sempervirens*), giant sequoia (*Sequoiadendron giganteum*), and bald cypress (*Taxodium distichum*). Although there is an 84′ tall dawn redwood in the Washington Park Arboretum, it has a smaller trunk, only 7′4″ in circumference.

4. **Cucumber Tree** (*Magnolia acuminata*)

Location: northeast corner of the Medicinal Herb Garden along Rainier Vista

Size: 78′ tall; trunk is 5′6″ inches in circumference.

Unlike most magnolias, this one does not have floral splendor. The small, greenish-yellow flowers appear in May after the tree has leafed out and are inconspicuous. Actually, the fruits are more interesting. In the early summer, while still green, the fruits look like small cucumbers two to three inches long, but by fall they have turned dark red and opened to expose plump red-orange seeds.

The cucumber tree's leaves are rather bold, five to thirteen inches long and about half as wide. In the spring and summer they are a light-to-medium green, turning a dull yellow in October.

Though its flowers and autumn color are unspectacular, the cucumber tree's large size makes it a striking sight, even when leafless in the winter. This large tree is one of the fastest growing magnolias and is best used as a shade tree for parks and large lawns.

Magnolia acuminata is native to the Appalachian region and the Ohio and Mississippi river valleys,

Cider gum (Eucalyptus gunnii).

generally growing on moist, fertile, loose-textured soils. The largest dimensions recorded for it are 125′ tall and trunks 24½′ in circumference. In Washington, this species of magnolia not only is our tallest member of the genus, but also has the stoutest trunk; a cucumber tree in North Seattle has a trunk almost 8′ in circumference.

5. **Crape Myrtle** (*Lagerstroemia indica*)

Location: Medicinal Herb Garden, east of Garfield Lane and north of Stevens Way

Size: 25′ tall (See photo on contents page.)

This small tree from China is infrequently planted in the Seattle area. While perfectly hardy, it blooms only when we have a long, hotter-than-average summer. The crape myrtle's affinity for heat makes it a standard landscape item in places such as Texas and California's Central Valley.

When crape myrtles do flower in Seattle, they are a knockout, being one of the few landscape trees showing vibrant floral color in late summer and early fall. Its petals are crinkled or crepe-like and come in colors of white, pink, lavender, or red. This specimen has raspberry-pink flowers. Just east of it is a smaller one with pale pink flowers.

Even when the crape myrtle does not bloom, it has attractive attributes. Its smooth, peeling bark is a beautiful pinkish beige with light gray mottling; this is especially showy in the winter after the leaves have fallen. The foliage starts out with an attractive bronzy tint in the spring, turns glossy green in the summer, and takes on a yellow or bronze color in autumn. Crape myrtles are late to leaf out in spring and to defoliate in fall.

If you want to grow crape myrtle in the Seattle area, try placing it against a hot southern or western wall, preferably surrounded by pavement that will create an especially warm microclimate. The Arboretum's crape myrtle used to be planted in such a location on the south side of the old Arboretum office, but was moved to the rockrose section in 1984 when construction of the Graham Visitors Center began.

6. **Cider Gum** (*Eucalyptus gunnii*)

Location: southwest side of Bloedel Hall

Size: 62′ tall; trunk is 3′4″ in circumference

As far as is known, this is the *tallest* eucalyptus in the state. Close on its heels, though, is a specimen of *Eucalyptus delegatensis* which measures 54′ tall. This latter tree is located just around the corner on the southeast side of Bloedel Hall. The *largest* eucalyptus known in Washington State is a *Eucalyptus perriniana* located in Seattle's Laurelhurst neighborhood; though only 44′ tall, it is 49′ wide and has a trunk circumference of 8′.

There are approximately 500 species of *Eucalyptus*, most native to the Australian region. They occur naturally in climates ranging from mild temperate to tropical, so only a few can be grown in our area. The cider gum is native to the mountains of Tasmania which experience some of the coldest weather to be found in Australia.

According to Dr. Stan Gessel, professor emeritus, College of Forest Resources, University of Washington, both of these campus specimens of eucalyptus were planted at their present sites in 1975. This means that they withstood the severe cold of December 1983 and the November 1985 blizzard, but defoliated during the winter of 1988. Whether they will recover fully from this winter's damage is still questionable, but the cider gum looks promising.

7. **Japanese Sawleaf Zelkova** (*Zelkova serrata*)

Location: along Stevens Way, northwest of Benson Hall and south of the Chemistry Library building

Japanese Zelkova. (Zelkova serrata)

Size: 41′ tall; 47′ wide; trunk is 5′ in circumference

The zelkovas are a genus of the elm family (Ulmaceae). You can notice the similarities in the leaves, which are serrated along the margins and asymmetrical at the base like most elm leaves. In the East and Midwest, zelkova has frequently been planted as a replacement for elms lost to Dutch elm disease. Zelkovas appear to be much more resistant, though not immune, to this devastating disease.

As a landscape tree, zelkova's other assets include a fair tolerance to wind, air pollution, and soil compaction. It is free from any major pest problems, too.

Notice the lacy appearance of the exfoliating bark which is common on older trees. The outer bark flakes off exposing an orange-brown layer beneath. The leaves are dark green in summer and turn yellow, orange, or rusty red in autumn. This particular tree turns yellow in late October.

Zelkova is native to China, Korea, Taiwan, and Japan, where it is a valuable timber tree. A high oil content makes the wood resistant to moisture.

8. **White Mulberry** (*Morus alba*)

Location: west side of Chemistry Library Building

Size: 56′ tall and nearly as wide; trunk is 8′2″ in circumference

The white mulberry is native to China where it has long been used for silkworm culture. In fact, it was introduced to eastern North America in colonial times when attempts were made to establish a silkworm industry in this country. That did not materialize, but the white mulberry did naturalize in the East and South.

Though uncommon in western Washington, mulberries have been widely planted in drier areas of the West because they are easy to grow and their glossy, handsome leaves provide a quick source of shade; the sprawling suburbs of California are full of fruitless forms of *Morus alba*. Rank growth, weak wood, and heavy surface roots, though, limit the landscape use of white mulberry.

This particular specimen is a fruitless form with three main trunks and attractive bark. If you visit in late October or early November, the leaves should have turned yellow.

Van Bobbitt is the Master Gardener/Urban Horticulture Coordinator, Washington State University, Puyallup, and is a member of the *Bulletin* editorial board.

Arthur Lee Jacobson is the author of the forthcoming *Trees of Seattle* and has written several articles for the *Arboretum Bulletin*.

Call the Center for Urban Horticulture (543-8616) for information about tree walks on campus or to report larger trees.

White mulberry (Morus alba).

Wildlife in the Japanese Garden

by Timothy W. Grendon

Dirty Harry stands in the chilly shallows along the stone cape almost frozen with the intensity of his hunt. His long neck is fully extended and his eyes pierce bare branch reflections in search of movement, of food. All is still and his belly remains empty; it is winter in the Japanese Garden. The thirty koi school in suspended animation in a deep pool near the Samurai stone, frogs rest silently under a skim of ice in the harbor, and all five of the turtles (red-or yellow-eared sliders) are mudded-in for the season. A woodpecker hammers out his hunger in rat-a-tat time on an old bigleaf maple and the great blue heron—fed up, but not fed—emits an eerie squawk and flaps skyward to find his meal elsewhere.

The heron returns to the Japanese Garden in the spring and his shadow over the lake brings an instinctive fear to the myriad of water life newly awakened by the sun's warming. The Japanese Garden is a place of feasting for many creatures of the wing and Harry must compete with kingfishers, green herons, and bitterns for the frogs, tadpoles, koi, perch, crayfish, and baby turtles that live in the lake. Harry (and his kin, who were raised in a fir tree in the Arboretum) stand apart from the other hunters as the only threat to the larger koi. They have been put on the welcome-only-in-winter list. He attained this status by eating "Hirohito," a beautiful black, white, and metallic silver koi, in the spring of 1986. This dire deed was witnessed by a gardener who was pruning in a willow tree.

"Please stay off the moss." Ha! Robins and red-shafted flickers bill-dig in the moist green carpet, hunting for bugs and worms to feed their hungry young. Squirrels scamper about ferreting out acorns and stripping shaggy bark off the *Cryptomeria japonica* (Japan's timber tree with a cedar-like bark) for lining their nests. Flocks of grosbeaks rest for a day and varied thrushes pick about, feeding before journeying on.

Keeping an eye on all the activity of spring and ready to charge at any perceived threat is a large Canada goose. He protects his mate and the eggs

Photos by R. Bruce Eckley

A turtle in the Japanese Garden pond.

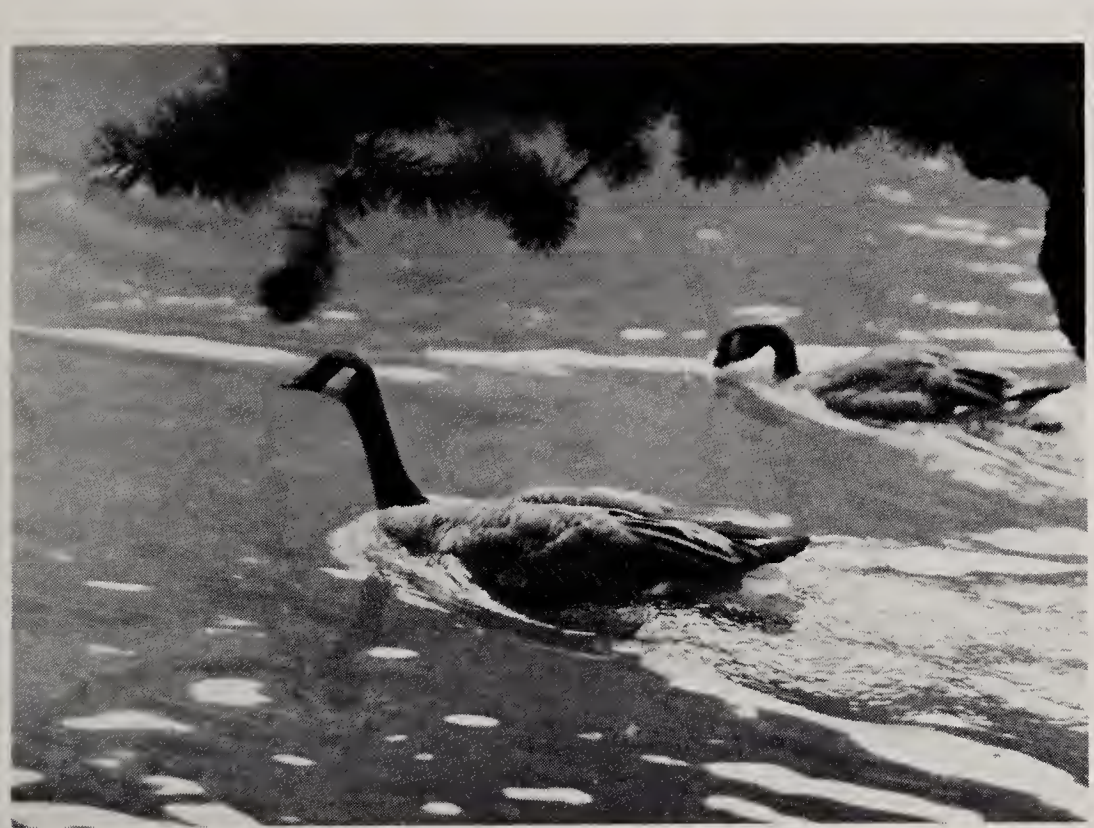
she laid in a nest of feathers and shredded moss on Turtle Island. Unfazed by the geese, frogs laze on the mossy hump of the island warming in the sun and singing for mates. Soon there will be masses of eggs, tadpoles, and much *thurumping* vocal splendor. The koi will feast on frog eggs and then, thrashing about in a colorful roil, lay their own amid the watery roots of willow and juniper.

Tadpoles and little koi. Summer. The raucous call of the kingfisher and the silent, lily pad steps of the green heron come to the Garden. Violet-green swallows (*Tachycineta thalassina*) perform their aerial ballet above the lake, a dining dance that mosquitoes, midges, and dragonflies will not survive. Frogs sit as stones among the shore reeds, waiting for just the right fly. Wet footprints on the bridge mark the crossing of masked bandits who came crayfish hunting in the night. A feral cat scoots furtively through the orchard ignoring calls of "Kitty, kitty."

Two goslings have hatched and rapidly grown to near the size of their father who has mellowed somewhat now that the nest has been abandoned. The gardeners are eagerly awaiting the day that parents and young fly away taking their less-than-tidy habits with them. Gramps, an old one-eyed bullfrog, sits in the wet grass at the water's edge and tolerates a gentle finger petting. He arches his back and closes his good eye. Frog ecstasy! Gramps likes quiet children and, sharing this preference with other animals, serves as a good reason for no running, no yelling.

Autumn will arrive red-yellow-orange around the lake, symbolic warmth for the bittern feeding among the cool roots of water iris. The fish move more slowly now, easing into their winter stillness. Buffleheads and mergansers paddle through mirrored foliage and dive for a meal of crayfish and koi. Cedar waxwings flit about the mountainside eating mountain ash (*Sorbus*) and salal berries, fattening up for the impending winter. A younger version of Dirty Harry will wing over the lake. The seasons pass and the sleeping, feeding, breeding tale begins anew for the animals of the Japanese Garden.

Timothy W. Grendon was the senior gardener at the Arboretum's Japanese Garden from April 1983 until May 1989. He now operates a garden consulting and pruning business called Tanoshii Niwa (Pleasant Garden).



Canada geese float during a summer day.

The attack goose, based on turtle island, defends his territory (right).

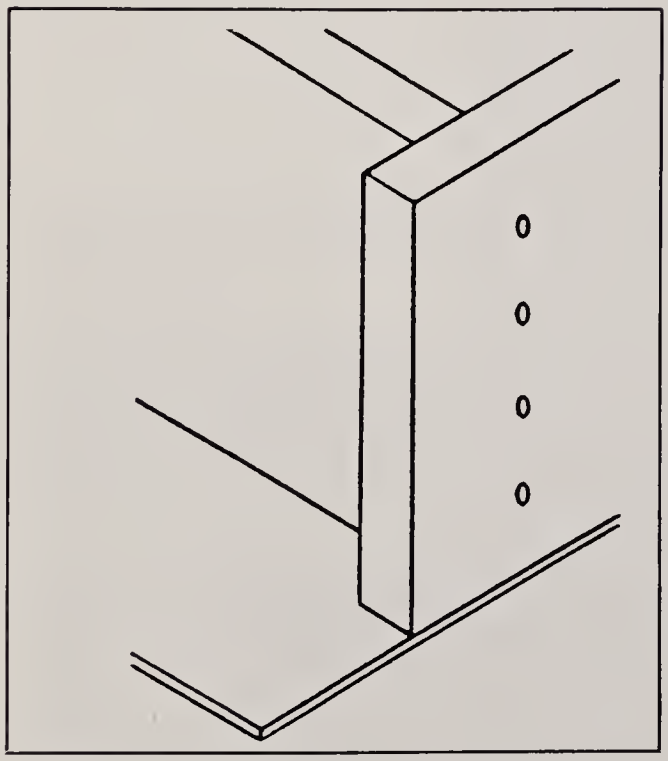
Green Management of the Suburban Homesite: Sifting Soil

by Victor B. Scheffer

Instructions are given for making three sieves for different types of soils.

Soil sieve, 28" x 28"

Dry storage for sifted soil



Detail on corner of soil bin

One of the pleasures of landscaping is handling soil, for soil is more than "dirt"—it is a complex membrane of living and lifeless materials. No two soils are alike; each has its own chemistry and its own micropopulations. A well-tended soil is like a bank account that allows you to deposit and withdraw while steadily improving the capital value. If you try to convert untilled or native soil to garden use you may find that it contains coarse materials such as stones, lumps of clay, and roots. Sifting will remove them. Sifting also gives opportunity to add, during the process, soil-balancing ingredients such as sand, peat, leaf mold, or dolomite. Sifting can be done at any time when it's not raining, though best in the fall when garden chores have slacked off and a few rains have settled the dust.

Making a Sieve

To work with soil you need an assortment of sieves. I describe three that accommodate soils of various textures. Each is made of galvanized hardware cloth mounted in a wooden frame. Its two faces are alike, so the sieve can be flip-flopped to free it of rootlets and other clinging fibers. The finished sieve measures 28″ x 28″ and can be supported on the rim of a contractor's wheelbarrow of that width.

The frame is made of "one-by-four" (¾″ x 3½″) pine boards. The cloth is cut to 26″ x 26″ from a 36″ roll. (If you can find a 24″ roll, a 24″ x

24″ cut will serve and will save waste.) The three sieves are:

Three-quarter-inch mesh for sifting coarse materials such as compost, bark, and leaf mold.

One-half-inch mesh for sifting garden soil and soil to be placed around new transplants. This mesh also is handy for removing coarse bits from burn-pile ashes, leaving the finer particles to be scattered around plants that flourish in a slightly alkaline soil.

One-quarter-inch mesh for sifting soil to be used in pots and flats.

All three sieves can be assembled at home by following these steps:

1. From each of two 10′ one-by-fours, cut two 28″ and two 21″ pieces.

2. Form a square by laying two of the 28″ pieces and two of the 21″ pieces on a concrete floor. It is easier to form the square if one piece can be butted against a wall.

3. Fasten the piece of 26″ x 26″ cloth to the square with about sixteen ¾″ galvanized staples; using more may split the wood.

4. Lay the other four boards on the square, rotating them 90 degrees from its orientation. Drill holes for the nails as a safety factor. Nail the four boards to the square with about sixteen 8d (2½″) galvanized nails and clinch the nails along the grain of the pine.

5. Drill a 17/64″ hole near each corner of the sieve. Then insert a ¼ x 2″ bolt with two ¾″ washers, and tighten the combination. (I use a bolt sold as a *hex nut screw*.) If stored under cover when not in use, the sieve should last ten years or longer.

Sifting and Storing

I've found no better way of sifting soil than to rub it through hardware cloth by hand, wearing heavy vinyl-coated gloves. This breaks up the lumps while separating the components. If the soil is sticky, it can be "lubricated" with sand or peat moss. A few handfuls of dry sand are surprisingly effective. I buy sand in 60- or 100-pound bags only because I don't have dry storage for larger—and much cheaper—bulk deliveries.

If the sifted soil is to be kept dry, it can be stored in a covered, ventilated bin measuring 4′ x 7′ and resting on a sheet of plywood. So:

1. Cut two 7′ and two 45″ boards from two-by-twelve cedar. Arrange them on a floor like the walls of a rectangular room. The shorter boards go inside and the longer ones extend 1½″ beyond the short ones at each end, to keep the longer ones from splitting when they are nailed (see illustration).

Drill a total of 16 holes for 40d (5″) galvanized nails, using a smaller bit for the inside (end grain) boards to insure a tight grip on the nails. (If you are a perfectionist, you may substitute for the nails, ¼″ x 5″ gimlet point lag bolts.) Nail the longer boards to the shorter ones.

2. Fasten a 4′ x 8′ sheet of ¼″, exterior grade plywood to this rectangular frame with 5d (1¾″) nails. The plywood need not be cut to 7′; it will simply extend beyond the frame at each end for a distance of 6″.

3. Treat the bin with a preservative such as is used for greenhouse flats (e.g., Woodpressure Preservative,® containing not over 1% copper equivalent). Carry the bin to a level, well-drained site handy to your garden.

4. Buy two sheets of 26″ x 96″ corrugated fiberglass greenhouse panel (*not* the flimsy panel sold in most home-and-garden stores). Join the sheets side by side along a ridgepole consisting of an 8′ two-by-four, narrow edge up. Use 1¾″, broad head aluminum nails designed for nailing through plastic. Cover the joint with an 8′, one-by-four strip of fir, pine, or hemlock.

This bin will hold seven to eight wheelbarrow loads of soil. To increase its capacity, raise the cover with two loose two-by-four stringers and brick risers.

It's helpful—as well as fun—to shop around for the various materials that you will need to manage a suburban homesite. After you have tried the local home-and-garden center, look for listings in the yellow section of the phone book under Building Materials, Hardware, Lumber, or Marine Equipment and Supplies.

Since 1952, Dr. Victor Scheffer has been taming a wild, logged-off acre near Bellevue, Washington. He is a career biologist, retired from federal service and from lecturing in forestry and zoology at the University of Washington.

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In the Arboretum

by Christina Pfeiffer

The growing season has shown some interesting developments in the conditions of plants that were damaged by this past winter's harsh weather. Through the month of June, we began to see some plants go into serious decline or die, whereas others with very brown branches and foliage have now begun vigorous growth and regeneration. Our summer work schedule has concentrated on pruning, repair, and removal of plants affected by the winter, and augmenting the plant records with this information.

Look for Interesting New Specimens

Although the cold weather thinned out some of our plantings, we have continued to add interesting specimens to the collection areas. *Hebe salicifolia* was grown from seed collected in 1988 from New Zealand by Curator Timothy Hohn, and has been planted in a bed near the *Hamamelis* collection along the south end of Arboretum Drive.

A selection of perennials from Bressingham Garden in Great Britain has been incorporated into several areas of the Arboretum. *Agapanthus* 'Bressingham White', *Geranium* 'Russell Pritchard', *Perovskia atriplicifolia*, and *Heucherella* 'Bridget Bloom' have been added to the new landscape plantings across from the Visitors Center. *Bergenia*, *Crocosmia* 'Firebird', and *Hemerocallis* 'Stella de Oro' have been added to the Rock Garden plantings.

Two selections of *Pulmonaria* were added to the Joseph A. Witt Winter Garden, and two types of iris with variegated foliage were planted next to the ponds in the Woodland Garden.

The older planting of *Primula japonica* along the stream in Rhododendron Glen has shown good regeneration and blooms with continued care from the Seattle Parks Department staff which keeps the grass and horsetail at bay. More *Primula* will be added to the stream side, and new clumps of *Aconitum septentrionale* (monkshood) and *Arrhenatherum elatius* 'Variegatum' (oat grass) will provide additional interest to this area of the glen.

Thanks to the Volunteers

The Arboretum has benefited from the special efforts of several volunteer groups this past spring and summer. The Amigos de las Americas spent a Saturday in April clearing out an area of brush and blackberry at the south end of the Arboretum near the Boxwood Collection. The Northwest Girls Choir spent a half-day weeding beds at the north end of Azalea Way. The Seattle North Stake Youth Group of the LDS church did a work project spreading wood chips at the lagoon, weeding beds on Azalea Way, and picking up litter. A group from Stepworks (an adult work rehabilitation program) comes to the Arboretum one day each week to weed, mulch, and sweep the walks around the Graham Visitors Center. The efforts of all these groups are a special addition to our volunteer support.

Join the Weeders!

There never seems to be enough help to keep the beds weeded, and each spring the weeds grow and gain ground faster than we can keep up with them. This past fall, our efforts at weeding and mulching beds (plus the use of pre-emergent herbicides in problem areas) were very effective in reducing the resurgence of weed growth in the spring. To capitalize on this timing, we are planning a two-day volunteer work party on Friday afternoon (October 20) and Saturday morning (October 21). Pick a day, mark your calendar, and join us for some weeding amidst the display of fall color!

Christina Pfeiffer is the horticulturist for the Washington Park Arboretum.

Cold Injury at the Washington Park Arboretum

by Timothy Hohn

The winter of 1988-89 was very sobering for those of us who remembered the last two balmy winters and decided to boldly plant what no Washingtonian had planted before. Perhaps we thought that the northerly flow of Californians was beginning to affect our climate. And why not? During the previous two years we could have successfully overwintered a broad selection of landscape plants from Southern California.

On February 1, 1989, a severe cold front from Alaska swept into the Puget Sound region bringing record and near-record low temperatures. Our computer-monitored weather station at the Center for Urban Horticulture recorded three successive nights of single-digit lows: 7° F on February 2; 8° on February 3; and 9° on February 4. Night-time lows remained below 20° F for six nights in a row and did not rise above freezing for two weeks. Prior to the arrival of this cold front, our weather had been quite mild in spite of one rather heavy snowfall. In fact, temperatures in the mid 40s to mid 50s through much of January may have predisposed many semi-dormant, partially deacclimated plants to the resulting cold damage.

The cold damage suffered by plants in the Arboretum was the result of direct freezing damage or physiologic drought and desiccation of the aerial portions of the plant. Freezing damage occurs when excessively cold temperatures alter cell membranes which do not recover, causing cells to die. Different plants and plant parts exhibit varying degrees of resistance to freezing. Physiologic drought may occur when the roots are frozen or sufficiently inhibited from supplying water to the aerial portions of the plant, which leads to the desiccation and death of those parts. This is the cause of leaf burn, or scorch, on broadleaved evergreens and commonly occurs on sunny, cold days when water is lost from the leaves more rapidly than it can be replaced.

The following list of cold-injured plants at the Arboretum is divided into groups according to the type and severity of injury. The degree of injury was determined by one visual inspection. The degree and type of cold injury to similar plants will vary according to their specific location, age, and condition prior to exposure. The extent of cold injury, in some cases, may not be fully expressed or accurately determined for several months, or even years, after exposure. The final condition of some of the plants reported here may change markedly by the time of publication. For example, some plants reported as dead to the base may have resprouted and nearly recovered to their pre-injury stature. Others may never resprout and still others reported as defoliated may not survive. Use this report as a guide and conduct a personal examination of plants of particular interest to you.

Before presenting the specific lists, some generalizations should be noted. Undoubtedly, there was a much larger number of rhododendrons that suffered bud blast than noted here. At the time of this inventory, most of the early-flowering rhododendrons that may have suffered bud blast had dropped their buds. Large numbers of camellias also suffered bud blast and some degree of leaf burn. Only a representative sample of these appears in the inventory. Very few of the rhododendrons or camellias suffered severe damage during this cold period. Finally, plants which appear on more than one list are represented by several specimens exhibiting a range of damage types.

The total number of damaged plants is only a fraction of the entire collection. However, there are some noteworthy survivors that suffered little or no damage:

Agave desertii, *Adenocarpus decorticans*, *Austrocedrus chilensis*, *Ceanothus* x *veitchianus*, *Cercis siliquastrum*, *Cistus* x *corbariensis*, *Cytisus battandieri*, *Daphne retusa*, *Daphniphyllum macropodum*, *Embothrium coccineum*, *Eucalyptus perriniana*, *Eucryphia glutinosa*, *Hebe ochracea*, *H. pinguifolia* 'Pagei', *H. decumbens*, *Hydrangea aspera*, *Illicium* species, *Itea ilicifolia*, *Lithocarpus densiflorus*, *L. henryi*, *Manglietia fordii*, *Mahonia* 'Arthur Menzies', *Nothofagus dombeyi*, *Pasania edulis*, *Phyllocladus alpinus*, *Pimelea linifolia*, *Pistacia chinensis*, *Quercus agrifolia*, *Q. chrysolepis*, *Q. ilex*, *Q. laurifolia*, *Q. myrsinifolia*, *Q.* x *turneri*, *Stachyurus praecox*, *Sycopsis sinensis*, *Trochodendron aralioides*, and *Umbellularia californica*.

Lists of damaged plants follow on pages 20 and 21.

Tim Hohn is the curator of plants of the University of Washington's Center for Urban Horticulture, which includes the Washington Park Arboretum.

Winter Damage in the Washington Park Arboretum, 1989

Bud Blast
(flower buds damaged and aborted)

Camellia 'Elsie Jury'
C. japonica 'Caprice'
C. japonica 'Daikagura'
C. japonica 'Donna Herzilia de Freitas Magalhaes'
C. japonica 'Edwin H. Folk'
C. japonica 'Jupiter'
C. japonica 'Rising Sun'
C. japonica 'Seihi'
C. saluenensis 'Chimes'
C. sasanqua 'Shishi-gashira'
C. x *williamsii* 'Brigadoon'
C. x *williamsii* 'Caerhays'
C. x *williamsii* 'November Pink'
Magnolia campbellii
M. campbellii ssp. *mollicomata* x *M. campbellii* ssp. *campbellii*
M. officinalis
Parrotiopsis jacquemontii
Paulownia tomentosa
Rhododendron arizelum
R. barbatum
R. 'Cilpinense'
R. falconeri
R. irroratum
R. macabeanum
R. 'Princess Alice'
Hebe albicans
H. subalpina
H. 'White Gem'
Hedera helix 'Hibernica'
Hypericum inodorum 'Elstead'
Lavatera olbia
Leptospermum lanigerum
Lomatia longifolia
Maytenus boaria
Olearia albida
O. solandri
Persea thunbergii
Phlomis italica
Pyracantha angustifolia
P. crenato-serrata
Rhododendron dalhousiae
R. fragrantissimum
R. 'Great Crest'
R.'Kirin'
R. polyandrum
R. 'Seta'
Sarcandra glabra
Sarcococca hookeriana var. *digyna*
S. saligna
Schisandra propinqua var. *sinensis*
Vaccinium urceolatum
Vestia foetida
Viburnum atrocyaneum
V. propinquum var. *lanceolatun*
P. rogersiana 'Aurantiaca'
P. 'Watereri'
Rhododendron falconeri
R. 'Gold Mohur'

Dieback
(varying degrees on twigs and branches)

Arbutus andrachne
Arctostaphylos stanfordiana
Ceanothus thyrsiflorus
Cercis occidentalis
Cercocarpus betuloides
Cistus 'Elma'
C. hirsutus var. *psilosepalus*
C. ladanifer
C. laurifolius
C. nowakianus
C. palhinhae
Cotoneaster buxifolius
C. glaucophyllus f. *serotinus*
C. morrisonensis
Crataegus mexicana
Cytisus borysthenicus
C. nigricans
Daphne odora
Erica erigena
Escallonia 'Donard Seedling'
Euonymus japonicus
Garrya elliptica 'James Roof'
Genista cinerea
G. hispanica
G. tenera
G. tinctoria
Halimium ocymoides
H. umbellatum
Hebe amplexicaulis
H. ochracea
H. pinguifolia 'Pagei'
Helianthemum num mularium
Hypericum elatum
H. stellatum
Ilex cornuta
I. purpurea (chinensis)
Lagerstroemia indica
Laurus nobilis
Lavatera olbia
Leptospermum humifusum
Loropetalum chinense
Magnolia campbellii ssp. *mollicomata* x *M.* ssp. *campbellii*

Dead to Ground
(aerial parts dead; resprouting may occur)

Agapetes repens
Azara lanceolata
Buddleia davidii var. *alba*
B. 'Lochinch'
B. 'Petite Plum'
Cassinia fulvida
Ceanothus thyrsiflorus
Cistus crispus 'Descanso Rock Rose'
C. populifolius
C. salviifolius
Coprosma sp.
Crinodendron patagua
Eriobotrya deflexa
Escallonia rubra

Defoliation
(all foliage damaged and dropped)

Camellia saluenensis 'Chimes'
C. sasanqua 'Shishi-gashira'
C. x *williamsii* 'Brigadoon'
C. x *williamsii* 'November Pink'
Ceanothus thyrsiflorus
Cistus parviflorus
Cotoneaster buxifolius
Distylium racemosum
Escallonia 'Donard Seedling'
Ilex cornuta
I. purpurea (chinensis)
Maytenus boaria
Pieris forrestii
Pittosporum glabratum
Pyracantha rogersiana

M. officinalis
Maytenus boaria
Meliosma tenuis
Nothofagus menziesii
Nothofagus obliqua
Olearia phlogopappa
Osmanthus yunnanensis
Paliurus spina-cristi
Phormium tenax
Pieris forrestii
Pinus radiata
Pittosporum glabratum
Prunus x *incam* 'Okame'
Pterocarya stenoptera
Punica granatum 'Plena'
Pyracantha 'Ngave'
P. rogersiana 'Aurantiaca'
P. 'Watereri'
Quercus arizonica
Q. rugosa
Rhododendron 'Ann Carey'
R. 'Chanticleer'
R. cinnabarinum
R. davidsonianum
R. 'Gene'
R. replicata
Sarcococca confusa
Schisandra propinqua var. *sinensis*
Senecio 'Sunshine'
Styrax californica
Tilia amurensis
Vaccinium urceolatum
Vestia foetida
Viburnum odoratissimum
V. tinus var. *purpureum*

Leaf burn
(some degree of foliage burn only)

Abies bracteata
Arbutus unedo
Arctostaphylos canescens
A. manzanita
A. stanfordiana
A. stanfordiana var. *bakeri* 'Louis Edmonds'
Austrocedrus chilensis
Bupleurum fruticosum
Buxus wallichiana
Camellia japonica 'Daikagura'
C. japonica 'Dona Herzilia de Freitas Magalhaes'
C. japonica 'Edwin H. Folk'
C. reticulata f. simplex
C. sasanqua 'Shishi-gashira'
Carpenteria californica
Ceanothus incanus
Cercocarpus betuloides
Chrysolepis chrysophylla
Cistus x *corbariensis*
C. 'Elma'
C. hirsutus var. *psilosepalus*
C. incanus
C. ladanifer
C. laurifolius
C. nowakianus
C. palhinhae
Comarostaphylis lucida
Cotoneaster 'Cornubia'
C. glaucophyllus f. serotinus
C. lacteus
Crataegus mexicana
Cupressus arizonica
C. macrocarpa 'Golden Pillar'
Daphne odora
Elaeagnus macrophylla
Erica erigena
Eucalyptus gunnii
Eucryphia x *nymansensis*
E. x *intermedia* 'Rostrevor'
Euonymus japonicus
Eurya japonica
Fabiana imbricata
Garrya elliptica 'James Roof'
G. x *issaquahensis*
Genista hispanica
Holboellia coriacea
Hydrangea integrifolia
Ilex x *altaclarensis* 'Atkinsonii'
I. integra
Illicium anisatum
Laurus nobilis
Ledum groenlandicum
Leptospermum humifusum
Lindera glauca
Loropetalum chinense
Michelia compressa
Myrica californica
Nolina microcarpa
N. solandri var. *cliffortioides*
Osmanthus delavayi
O. yunnanensis
Pasania glabra
Pernettya mucronata
Persea yunnanensis
Phillyrea angustifolia
P. latifolia var. *spinosa*
Phlomis fruticosa
Photinia x *fraseri*
Pinus montezumae
P. pinea
P. radiata
Pittosporum tobira
Podocarpus macrophyllus
Prunus laurocerasus (dwarf) x *Pyracomeles* species
Quercus arizonica
Q. glauca
Q. hypoleucoides
Q. phillyreoides
Q. rugosa
Q. suber
Q. turbinella
Rhododendron 'Ann Carey'
R. arizelum
R. barbatum
R. 'Barclayi'
R. 'Chanticleer'
R. x *cilpinense*
R. cinnabarinum
R. 'Daphne'
R. discolor x *R. kyawi*
R. 'Fantasy'
R. 'Gold Mohur'
R. indicum
R. irroratum
R. loderi 'Sir Joseph Hooker'
R. macabeanum
R. 'Maxwell'
R. monosematum
R. 'Ole Speaks'
R. praestans
R. 'Princess Alice'
R. racemosum
R. ririei
Ribes laurifolium
Sapindus mukorossi
Sarcococca confusa
Sequoia sempervirens 'Los Altos'
S. sempervirens 'Santa Rosa'
Sycopsis sinensis
Ternstroemia gymnanthera
Umbellularia californica
Viburnum davidii
V. odoratissimum
V. tinus
V. tinus var. *purpureum*

The Northwest Garden Explorer

by Scot Medbury

The Pacific Northwest Native Garden in Tacoma offers an opportunity to see native plants in cultivation.

Interest in growing native plants seems to be on the increase in the Northwest. Home gardeners and landscape professionals alike are discovering the environmental and aesthetic virtues of Northwest natives, while nurseries are offering expanded inventories of the many desirable members of our flora.

It is surprising, therefore, that there are few places for people to go to see and learn about native plants in cultivation. Although it is relatively easy to go up into the Cascades or to one of the lowland state parks to view garden-worthy natives, seeing these gems in the wild and growing them in the garden are two very different things.

Fortunately, the Puget Sound area has the excellent, but unassuming, Pacific Northwest Native Garden in Tacoma. Comfortably situated on a sloping five-acre tract near the entrance to the Point Defiance Park, it effectively captures the natural essence and tranquility of Northwest plant communities. An inspired design and an intriguing collection of rarely-seen Northwest trees and shrubs make this garden one of the Northwest's best.

The Pacific Northwest Native Garden is an ongoing project of the Tacoma Garden Club, an early supporter of the Washington Park Arboretum. The garden was started in 1963 on a site provided by Tacoma's Metropolitan Park District. Today, the very active members of the Tacoma Garden Club continue to maintain and expand the Native Garden with the able assistance of Point Defiance Maintenance Foreman Lee Fellenberg.

Landscape plans for the garden were drawn concurrently with initial site development. After the site was prepared, one of the first projects was to transform the central ravine into a naturalistic waterfall and pond. This task was masterfully accomplished by Ray Prentice of Prentice Nursery in Kent, who had created the spectacular outcrops at Olympia's Tumwater Falls Park only a few years before. Like many good water features, the Native Garden's 27′ cascade drowns out the sounds of the outside world.

The waterfall and stream conveniently split the Native Garden in two, which gave the garden's creators the idea to divide the site into areas representing Pacific Northwest vegetation zones. One of the project's consultants was the noted rock gardener E.H. Lohbrunner of Victoria, British Columbia, who prepared several planting plans for the various zones.

Seven zones were eventually developed and are identified on a carved wooden map at the garden's entrance. A *bog* area surrounds the pool, where rushes and sedges, as well as Labrador tea and bog cranberry, luxuriate. Bordering both sides of the stream is the *coastal forest zone*, with the many familiar trees and shrubs of the lowlands growing as they do in nature. Behind this area, a newly created *meadow* spreads out beneath the open sky, in strong contrast to the sense of enclosure experienced elsewhere in the garden. A *San Juan* area contains several of the drought-tolerant natives of that archipelago. Up the path from here is the *scree*, where a constant trickle of water runs through plantings of lewisias, penstemons, and rock ferns. The *sub-alpine* zone displays conifers and a diversity of mid-altitude Cascade shrubs and ground covers. Newest of the zones is the *East Cascade* area, which features a stunning basalt rock formation completed by Prentice Nursery in 1985. Trial plantings of shrubs from the eastern side of the Cascade Range dot this site.

Interesting plant material can be found throughout the garden, including some specimens otherwise seen only in the wild or in private gardens. A 20-foot-tall Garry oak in the San Juan zone is thriving despite having been moved twice. This is unexpected, given the Garry oak's reputation for fussiness. The specimen is one of the very few Garry oaks that actually have been planted in the Northwest, a situation that gardeners can and should remedy.

Many woody treasures are found growing between the scree and the Eastern Washington area. Attractive bronze, scaly shoots identify the Saskatoon berry, *Shepherdia canadensis*, a hardy shrub with great landscape potential. The refined leaf of our native Douglas maple, *Acer glabrum* var. *douglasii* sets it apart from either the more familiar vine or bigleaf maples. Also in this area are two plants of the rare dwarf tanbark-oak, *Lithocarpus densiflorus* var. *echinoides*, which adds an element of the Siskiyou flora to the collection.

In other places, visitors will discover the golden chinquapin, *Chrysolepis chrysophylla*, the Brewer spruce (*Picea breweriana*), and other aristocrats of the Northwest flora.

One of the original group of the Native Garden's founders was Mrs. Corydon Wagner, Jr., whose Lakewold estate on Gravelly Lake is widely recognized as one of America's finest gardens. In 1973, Mrs. Wagner asked the celebrated landscape architect Thomas Church to bring his design expertise to Point Defiance, where he planned and sited the Native Garden's graceful gazebo. Nestled into the shrubs on a hillside above the pond, this modest building forms the garden's natural center, where all paths converge. The all-cedar gazebo's indigenous appearance is enhanced by Northwest Coast Indian design details, such as the bird faces on the rafter ends. A totem pole in the subalpine zone by Anacortes woodcarver Paul Luvera carries this Northwest Indian motif into the garden, enhancing the already splendid effect of the plantings.

Visitors to the Native Garden should explore the rest of 640-acre Point Defiance Park, which contains rose and bedding plant displays as well as a garden in the Japanese style. The bowl-shaped center of the landscaped portion of Point Defiance was an early twentieth-century design of the landscape architectural firm of Hare & Hare of Kansas City, Missouri, which also designed Longview, Washington—the Northwest's only "New Town" (developed as part of an early nineteenth-century urban planning movement). This area contains many venerable trees well worth admiring up close. Especially remarkable is the enormous Monterrey Cypress near the old bear cage, between the Japanese garden and the zoo. Unfortunately, Hare & Hare's impressive design is in jeopardy as park planners struggle to channel increased automobile traffic in the park. Other park attractions include a renovated zoo complex and the scenic five-mile drive around the Point, with views to the Narrows Bridge and Gig Harbor.

Point Defiance Park is open from 6 a.m. to one-half hour before sunset every day of the year. Signs direct the visitor from S.R. 16, the Bremerton freeway.

Scot Medbury is a graduate student at the Center for Urban Horticulture and a new member of the *Arboretum Bulletin* editorial board.

John Wott, CUH

Thomas Church's gazebo at the Pacific Northwest Native Garden, with Picea breweriana *on the far right.*

Other Northwest Native Gardens

The Northwest boasts several other native gardens of note. At the University of British Columbia Botanical Garden, visitors often overlook the 8-acre native garden in favor of the better-known ones. This native garden is remarkable for its diversity of herbaceous native plants, as well as for several excellent theme plantings. The planting devoted to escaped exotic plants, such as English hawthorn and scotch broom, forms an especially good exhibit of this type.

In Victoria, the British Columbia Provincial Museum expertly maintains a delightful native garden in the plazas surrounding the museum buildings. Well-grown and well-labeled, the plants in this garden are grouped into plant associations typical of various habitats in British Columbia. The beds are all located in the built environment, surrounded by aggregate plazas of regular geometry, which provides an interesting example of the use of natives in urban settings.

Small native plant gardens also have been started outside the Burke Museum on the University of Washington campus and at the State Capital Museum in Olympia.

The newly-planted Goodfellow Grove at the Center for Urban Horticulture is a thoughtful experiment in conceptual design and prescribed maintenance. Even at this early stage in its development, this planting of native trees, shrubs, and marsh plants promises to expand our perceptions of the use of native plants in the landscape.

A map of the Point Defiance Native Garden is available for copying (at cost) in the vertical files of the Elisabeth C. Miller Library, Center for Urban Horticulture; it will help you to identify and locate specific plants.

Northwest Hort Review

by Van M. Bobbitt

Gravel Can Impair Drainage!

It is common practice to add a layer of gravel or broken crockery to the bottom of planting containers, supposedly to improve drainage. Although this practice is often recommended by prominent garden writers and in respectable books and magazines, the fact is that adding gravel may actually *impair* the drainage of water from a container.

Water drains in a fairly regular pattern through a soil of uniform texture, but its movement is inhibited at the interface between media of different textures. Contrary to popular belief, water moves slowly from a soil with small, water-filled pores to one with large air-filled pores (Fig. 1). Yet this is exactly the situation we create when we place a layer of gravel or broken crockery beneath a fine-textured potting soil.

When you irrigate a plant in a container, much excess water will run out the drainage holes within a few minutes. This is referred to as *gravitational water*—water that moves through the soil under the influence of gravity. After the gravitational water drains out, though, there is still water left in the soil. This remaining water is held in small pores in the soil or is tightly bonded to soil particles. A fine-textured soil with small pore spaces and greater surface area will exert a stronger hold on the water than will a coarse-textured soil. A layer of gravel, on the other hand, has very large pore spaces and less surface area to which the water molecules can adhere.

Since the water is more strongly attracted to the fine-textured potting soil than to the coarse-textured gravel, it resists moving across the interface between the two. As a result, a layer of saturated soil develops just above the layer of gravel after irrigating (Fig. 2). Without the gravel, a layer of saturated soil still would develop, but it would be at the bottom of the pot instead of above the layer of gravel.

What Does the Gravel Accomplish?

Gravel actually decreases the depth of the potting soil, which leaves less rooting area for the plant. Second, the interface between the soil and gravel can create a perched water table, thus increasing the likelihood of root rots.

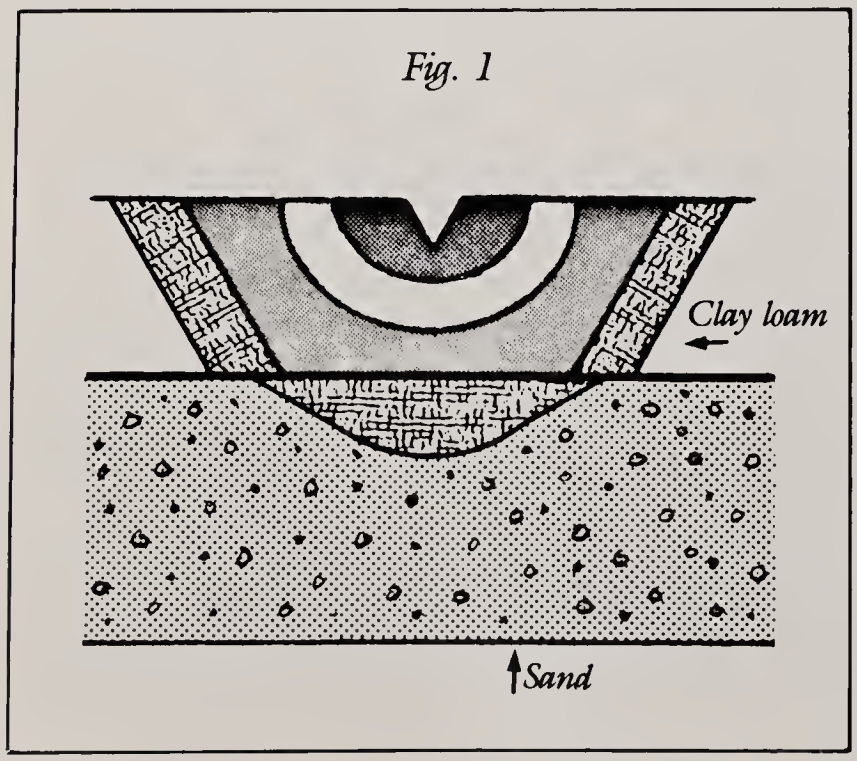
The take-home message is to avoid layers of gravel or broken crockery in planting containers. Just fill the container with a good potting soil. While some of the soil may wash through the drainage hole the first few times the plant is watered, this soon stabilizes. If you look at containerized nursery stock you will notice that growers never put gravel in the bottom of their pots for drainage.

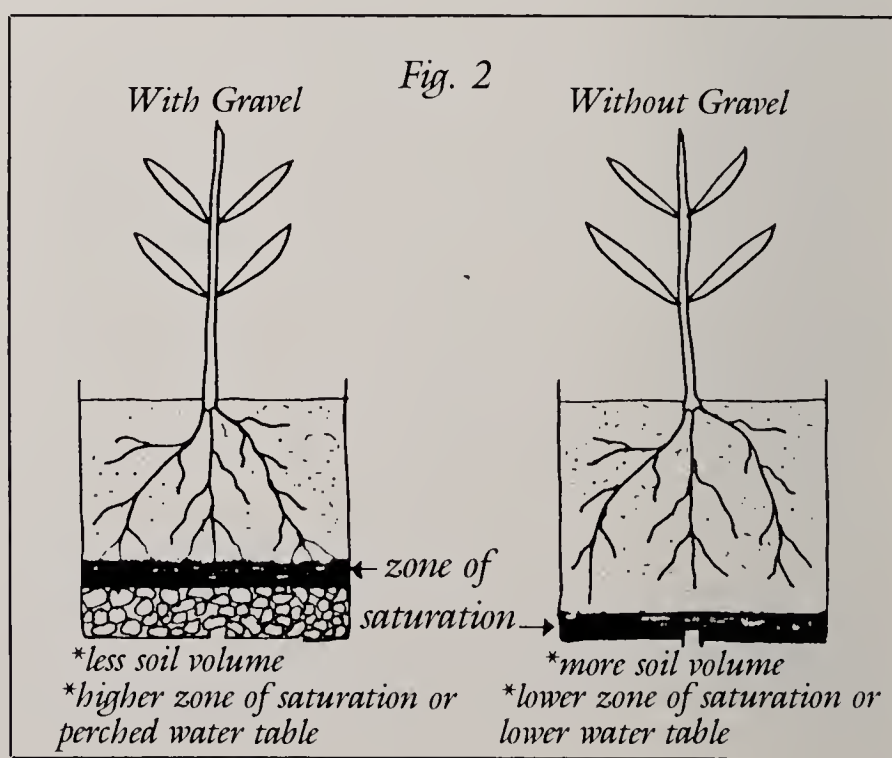
References

Donahue, R.L., R.W. Miller, and J.C. Shickluna. 1983. *Soils: An Introduction to Soils and Plant Growth* (fifth edition). Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Handreck, K.A., and N.D. Black. 1984. *Growing Media for Ornamental Plants and Turf*. Kensington, Australia: New South Wales University Press.

Van M. Bobbitt is the Master Gardener/Urban Horticulture Coordinator, Washington State University, Puyallup, and is a member of the *Bulletin* editorial board.

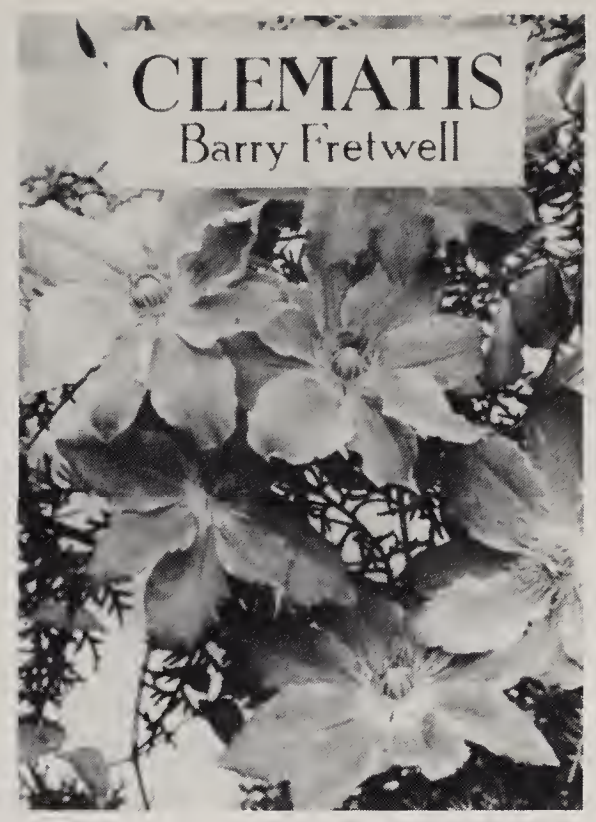




Book Reviews

Clematis. Christopher Lloyd, revised with Tom Bennett. Capability Books, Deer Park Wisconsin: 1989. 216 pages, index, 24 plates with 45 full-color photographs taken by the authors. $32.50.

Clematis. Barry Fretwell. Capability Books, Deer Park, Wisconsin. 1989. 160 pages, index. 120 full-color photographs. $24.95.



These books are timely in light of the resurgent interest in clematis. Heretofore, the only readily available reference work has been the third edition of Ernest Markham's little book, *Clematis*, published in 1935. The availability of the 1965 and 1977 editions of Mr. Lloyd's *Clematis* has been limited in the United States; the Seattle Public Library, for example, has only one copy of the 1965 edition. The two new books are not only timely; their authors' backgrounds as English nurserymen assure that they are applicable to the Pacific Northwest.

Mr. Lloyd's book could well be entitled *The Compleat Clematis* since it contains everything a gardener needs to know about the history, garden uses, cultivation, pruning, propagation, and diseases of the genus. More than 280 garden-worthy species, varieties, and hybrids are discussed.

It is a delight to read, and its candor is refreshing. For example, "If you are expecting a pure red large-flowered clematis, you will, as with pure blue, be disappointed." Or again, "Most clematis lovers . . . tend to reserve special wall space for their favorites. I am certainly not going to claim that this never works out successfully, but it does tend to emphasize the worst features of the clematis . . . ." He also explains in the book where he thinks an appropriate place would be.

Mr. Fretwell's book is less "compleat," but it complements the other in some unique ways. A brief introduction on the history, garden uses, and cultivation of clematis is followed by descriptions of about 200 kinds. These descriptions are in much greater depth than those in Mr. Lloyd's book. They include the blossom time and mature height—important points in making a selection. There are 120 full-color photographs, more than half of which are species or small-flowered hybrids that will be new to many—if not most—gardeners.

Why would a publisher issue these two books within six months of each other? The answer is simple. The publisher is in the business of selling books. Anyone who buys one of these will surely want the other.—Reviewed by Ward Horn.

Ward Horn is a member of The Arboretum Foundation and is active as an Arboretum guide. He also works on the seed exchange program.

The Bloedel Reserve: Gardens in the Forest. Lawrence Kreisman. The Arbor Fund, Seattle: 1988. 112 pages; numerous color and other illustrations. Paper: $14.95. Also available in hardcover.

This is a complete historical and chronological account of the development of the Bloedel Reserve, a partially forested estate of 150 acres on Bainbridge Island, Washington, in Puget Sound. It covers a period of more than 80 years, from the time that the land was purchased by the Collins family of Seattle, up to the present date.

The author is an architectural historian and lecturer in the Department of Urban Design and Planning, University of Washington. He also has written several books on various building styles in Seattle. The design and layout of this book is by Virginia Hand; it is well arranged and pleasing to the eye and hand.

The work is handsomely illustrated, with many color photographs by Mary Randlett, a well-known local photographer of persons and places, and by Dick Busher, working for the *Architectural Digest* in 1984. There are also reproductions of old photographs, drawings and plans.

The book is divided into five chapters. The first covers the early history of the land following settlement by European immigrants in the mid-eighteenth century to the acquisition of 45 acres by Mrs. John

Collins in 1904. The second discusses the building of the house overlooking Puget Sound to the east; the principal architect was J. Lister Holmes. Next is the purchase of the property by Prentice and Virginia Bloedel in 1951, their initial use of it, followed by gradual planning and development of various sections by several landscape architects, especially Thomas Church of San Francisco. Church laid out the road system and designed the several pools. The Japanese garden was constructed by F. Kubota of Seattle in 1956. Subsequently, from 1978 to 1985, Richard Haag was responsible for many innovative schemes and changes in the landscape, working closely with Mr. Bloedel and the curator, Richard Brown, who was appointed in 1976. The details of their actions, both successes and failures, will be particularly interesting to others in the profession.

In 1970, the entire property was deeded to the University of Washington, but because of fears that it would only be used as a teaching and research area, it was bought back by the Arbor Fund in 1985. This is a nonprofit group of about 20 members, created in 1974 to manage the property.

The final chapter, "Planning for the Public," brings in the Pittsburgh firm of Environmental Planning and Design to develop a master plan for the Reserve. As a result of their studies, a new gate house to accommodate the offices and receive visitors was designed and constructed, with parking to its rear. A system of trails also was laid out, covering all the principal ecological areas, from the old forest to the Japanese garden and the Reflection Pool.

An appendix lists briefly some of the principal plants to be seen at different seasons; there is also a list of sources tapped for information. To sum up, this is an important and handsome record of a unique undertaking for the Puget Sound region which holds great promise for future generations of students of landscape planning.—Reviewed by Brian O. Mulligan

The Reserve is now open to the public on certain days and hours, by appointment. Call (206) 842-7631.

Brian O. Mulligan is director emeritus of the Washington Park Arboretum.

For Further Information

by Valerie Easton

Journals and Newsletters:
Current, Concise, and Specialized Information for Gardeners

There are hundreds of horticultural journals and newsletters ranging from the scientific *HortScience* and *Journal of Environmental Horticulture*, to journals of professional interest such as *Landscape Management* and *Tree Worker*, on to the specialized *Primroses*, *The American Rose*, and *Camellia Journal*.

Many journals are expensive or difficult to locate. The Elisabeth C. Miller Library at the University of Washington's Center for Urban Horticulture is in the enviable position of receiving many suggestions for titles to purchase as well as acquiring gift subscriptions from knowledgeable and generous staff, faculty, publishers, societies, and the general public who use the library.

We would like to draw attention to some useful and interesting titles of which the home gardener might like to be aware.

Journals

Fine Gardening (bimonthly). The Taunton Press, Inc., Newtown, Connecticut 06470. Introduced in 1988, *Fine Gardening* successfully combines practical information for the home gardener with beautiful, inspiring photographs. This top quality publication from the publishers of *Fine Homebuilding* is largely reader-written, drawing on a large pool of knowledgeable gardeners around the United States. The first issues have included articles on the culture of specific vegetables, flowers, and trees in addition to useful articles on topics such as building a lily pond, laying garden paths, and installing a home irrigation system.

Garden Design (quarterly). Published by the American Society of Landscape Architects, 4401 Connecticut Avenue N.W., Washington, D.C. 20008-2302. This is the kind of journal you eagerly anticipate receiving each season—beautiful color photography of lush expensive gardens. The emphasis is on design, structure, and the relationship between house and garden. Excellent information on the plants themselves is included, as in recent articles on hardy palms and drought-resistant natives. A nice blend of inspiration and practicality, gorgeous photos are interspersed with a seasonal

garden calendar and the best advertisements for horticultural products in any of the journals.

The Herb Quarterly. Sallie Ballantine, editor and publisher, P.O. Box 350, Newfane, Vermont 05345. An excellent example of a small, special-topic gardening journal, *The Herb Quarterly* has been published for over ten years. It includes articles on all aspects of growing and using herbs. A recent issue had recipes for herbal jams and jellies; information on herbal wreaths, carnivorous herbs, and catnip; how to incorporate the color blue into your garden scheme through the use of herbs; and a to-scale plan for a historic medicinal herb garden. A little something for anyone interested in herbs, from seed to kitchen.

Hortus (quarterly). David Wheeler, editor and publisher, The Neuadd, Rhayader, Powys, D6 5HH, Wales, United Kingdom. Debuting in 1987, *Hortus* is quintessentially British. The publisher describes it as a "private garden journal, free from the bother of 'big business' pressures, concerned with the decorative aspects of gardening . . . making available fine garden writing." Certainly, many of today's best-known garden writers are featured in its pages, including John Brookes, Beth Chatto, Penelope Hobhouse, and Will Ingwersen. The articles are personal and wide-ranging, and although the journal consists mainly of text, there are black-and-white photos, excellent line drawings, and extensive book reviews.

Plant Source: The Monthly Magazine of Nursery Stock Availability. Published by Robert Yount, InfoNet Services Corporation, 606 -110th N.E. #200, Bellevue, Washington 98004. Have you been looking for a 4′-5′ specimen of *Cornus kousa* var. *chinensis* or been trying to find a source for the large number of *Cotoneaster* 'Lowfast' specified by your landscape designer? The Northwest edition of *Plant Source* can give you just the information you need. Current and complete listings of plant type, nursery name and location, plus size, quantity, and cost of the plant can lead you right to what you are looking for. Listings include wholesale and retail nurseries throughout the Northwest, with complete addresses and shipping information. We're lucky to have such a guide to plant availability in our area.

Newsletters

The Avant Gardener: The Unique Horticultural News Service (monthly). Horticultural Data Processors, Box 489, New York, New York 10028. An inexpensive monthly newsletter, *The Avant Gardener* alternates between updates on current horticultural information and single-topic issues. An issue includes "News Briefs" with short book reviews and other horticultural news, and has articles on a variety of subjects, such as the best new flowers for 1989 and their suppliers, new potato mini-tubers, and the culture and source for the easy-to-grow orchid *Calanthe*.

Several issues per year are devoted to a single topic and include extensive bibliographies: shade gardening, perennials, and drought are recent examples. All this information is made accessible through an annual index published each fall. For the most current and plentiful information for your dollar, *The Avant Gardener* is perhaps second only to *Hort Ideas*.

Hort Ideas (monthly). Published by Gregory and Patricia Y. Williams, Route 1, Box 302, Black Lick Road, Gravel Switch, Kentucky 40328.

This five-year-old newsletter, indexed biannually, is fascinating for its variety and thoroughness. Its self-description reads: " . . . reporting on the latest research methods, tools, plants, books, etc., for vegetables, fruit, and flower gardeners, gathered from hundreds of popular and technical sources worldwide." Complete sources of information and plants are given, along with information on how to order many regional and inexpensive reports and brochures. Upcoming horticultural events, research in progress, and new books are among the monthly features.

For $30.00, the combined price of these two newsletters, you can buy an amazing amount and variety of current horticultural information.

Indexes

Now, how to find specific information in previous issues of these and other journals. For example you may remember seeing an article on *Ilex* x *meserveae* in a journal last year and need to find it again, or wonder how the topic of xeriscaping is being covered in the current journal literature. If you have an idea of which journal may have published the information for which you are searching, or have only certain journals you wish to use, it is most efficient to go directly to the indexes in those journals. Most journals provide annual indexes, usually in the December issue, by author and subject. Even if you need to look through several years, go directly to the journals themselves to save time and effort.

If you want to cover a larger variety of journals, two more general indexes would be of help:

The Gardener's Index (yearly, starting in 1986). Joy L. McCann, CompuDex Press, Kansas City, Missouri. This is a comprehensive index to half-a-

dozen gardening journals. It is arranged by a fairly general subject guide and a more detailed subject and author index. Home gardeners will find information that appeared in journals such as *Horticulture*, *Flower and Garden*, etc.

Horticultural Abstracts (monthly with yearly compilations). CAB International Information Services, Wallingford, Oxon, OX10 8DE, United Kingdom. Most useful for research-oriented articles, it is arranged by type of plant, with author and subject indexes. For example, you can look directly under "Lilacs," 'Bromeliads," "Medicinal Plants," or "Gerberas" to find out what has been published about them worldwide in over 1,000 journals each month or year. Journal articles are abstracted, so it is possible to tell their relevance to your research before searching for them. For the most thorough coverage of the wide variety of horticultural topics, *Horticultural Abstracts* is the first source to try.

Above we have just a few examples of what is available to gardeners in the journal literature, and how best to track down your specific topic of interest. *Ulrich's International Periodicals Directory* contains entries in many fields, including over 350 titles in the fields of gardening and horticulture; 200 are available in the Miller Library. Your interest may be in a specific type of plant or style of gardening (*African Violet Magazine*, *Alpine Garden Society Quarterly Bulletin*, *Holly Society Journal*, or *International Bonsai*, for example). If regional gardening intrigues you, there are many publications from which to choose (*Pacific Horticulture*, *Douglasia*, *Gardens West*). Professional publications may be important to your business or other interests (*Pacific Coast Nurseryman*, *Washington Landscape Architect*, *Interiorscape*). Those of you interested in the environment as a whole will find many choices (*Orion Nature Quarterly*, *The Northwest Environmental Journal*, *Landscape Ecology*, to name a few). Journals provide access to current information, some of the best writing, and the most enjoyable reading available on the wide and varied topics of plants, gardening, and horticulture.

Valerie Easton is a librarian at the Miller Library, Center for Urban Horticulture and the book review editor of the *Arboretum Bulletin*.

New on the Shelves of the Elisabeth C. Miller Library

VALERIE EASTON

Fairweather, Christopher. **Azaleas**. Chester, Connecticut: The Globe Pequot Press, 1988. The volume is written by a rhododendron expert who worked for years at the world-famous, azalea-rich Exbury Gardens. Along with cultural information, Fairweather recommends his favorite varieties for color, fragrance, and hardiness and provides a list of gardens, societies, and nurseries that specialize in azaleas. Despite all of these virtues, an additonal reason to buy and read this book is the 50 pages of truly spectacular color photographs that make one long to touch, smell, and grow these beauties.

Johnson, Warren T., and Howard H. Lyon. **Insects that Feed on Trees and Shrubs**, second edition. Ithaca, New York: Cornell University Press, 1988. Completely revised and expanded, this comprehensive manual covers 900 species of insects, mites, and animals that damage woody ornamentals. Two-hundred-and-forty-one color plates and a clear text make this an easily used diagnostic tool. It is arranged as a field guide and written for the home gardener, arborist, and nurseryman, as well as the professional entomologist. This manual will prove useful as the standard reference on insect damage and identification.

Sargent, Charles Sprague, editor. **Plantae Wilsonianae** (reprint of 1913 edition) in three volumes. Portland, Oregon: Dioscorides Press, 1988. Ernest Henry Wilson collected and introduced into cultivation a greater number of plants than any other collector, introducing the beauty and richness of the Chinese flora to the Western world. He traveled to Western China for the Arnold Arboretum in 1907-1908 and 1910, and there discovered several new genera and hundreds of new species and varieties of woody plants. These three volumes form a descriptive catalog of his discoveries, which can be found in herbaria and gardens throughout the world.

Also New

Clark, David. **Pelargoniums**. Kew Gardening Guides. Portland, Oregon: Timber Press, 1988.

Flaherty, David C., and Sue Ellen Harvey. **Fruits and Berries of the Pacific Northwest**. Edmonds, Washington: Alaska Northwest Publishing Company, 1988.

Hunt, John Dixon, and Peter Willis, editors. **The Genius of the Place: The English Landscape Garden 1620-1820**. Cambridge, Massachusetts: MIT Press, 1988.

Mitchell, Alan. **The Trees of North America**. New York: Facts-on-File Publications, 1987.

Wrigley, John W. **Australian Native Plants**, 3rd edition. Sydney, Australia: Collins Publishers, 1988.

Special thanks to the individuals and organizations who have contributed these books to the Elisabeth C. Miller Library, Center for Urban Horticulture, 3501 N.E. 41st Street, Seattle, WA. The library is for reference use only; a copy machine is available for public use. Hours are 9-8 Monday; 9-5 Tuesday-Friday.

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William Engg, University of Washington.

Sorbus hostii *(923-39). Close-up of flowering branch, June 3, 1959.*

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